Preparation of thermoelectric materials from melts

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A review of Melt preparation techniques is presented covering necessary phase relationships, synthesis/alloying and crystal growth of thermoelectric materials. The processes described require the knowledge of composition-temperature or composition-temperature-pressure phase diagrams. This knowledge enables the selection of the appropriate method of preparation, apparatus design and processing. The materials, from a technological point of view, will be roughly divided into three categories: low temperature materials (group V chalcogenides based on Bi_2Te_3), middle temperature materials (group IV chalcogenides based on PbTe) and high temperature materials (Si-Ge solid solutions). All known methods of preparation from melts are described and a comparative analysis is given.